Evidence in Support of Foster Care During Acute Refugee Crises

Ann Duerr, MD, PhD, Samuel F. Posner, PhD, and Mark Gilbert, MD

Objectives. The United Nations High Commissioner on Refugees (UNHCR) and United Nations Children's Fund (UNICEF) policy encourages foster care during refugee emergencies. We examined evidence to support this policy using data from the 1994 Rwandan refugee crisis.

Methods. The association of weight gain and acute illness with family status (foster children vs children living with their biological families) was examined using latent growth curve and repeated measures logistic regression analysis.

Results. Weight gain for all children averaged 0.40 kg/month and was associated with child's age but not with family status, child's or caregiver's sex, caregiver's marital status, possession of blankets or plastic sheeting, severe malnutrition, month of enrollment, or acute illness. Illness was not more common among foster children than among children living with their biological families.

Conclusions. This analysis supports the UNHCR/UNICEF recommendation of fostering for unaccompanied children during an acute refugee crisis. (*Am J Public Health.* 2003;93:1904–1909)

During war, acute refugee emergencies, and other natural disasters, thousands of children are orphaned or separated from their families. Official United Nations High Commissioner on Refugees (UNHCR) and United Nations Children's Fund (UNICEF) policy is to encourage foster care whenever possible as an alternative to placing orphaned or separated children in orphanages or centers for unaccompanied children, which are both costly and often report high rates of morbidity and mortality.[1,2] However, there is little information documenting how refugee children fare in foster care settings. Most published studies have focused on the psychosocial impact of the emergency and the role of fostering in modulating that impact. One such study of Guatemalan Indian children concluded that "when children victimized by war remain close to parents and loving caretakers, they can survive the trauma and recover a healthy attitude; when they are orphaned or separated from family, and by extension, community, they are extremely vulnerable."[3(p535)]

The Guatemalan study and similar studies of children displaced or orphaned by war or famine have found positive effects from fostering. However, these studies have been conducted after the acute phase of the refugee crisis and have focused primarily on social and psychological outcomes. Thus, they provide little understanding of the consequences of fostering for the physical health of children during the acute phase of refugee crises, when children are most likely to be orphaned or separated from their families. On the basis of currently available data, it is unclear whether the recommendation to encourage foster care whenever possible is appropriate.

To address this question we examined health indicators for foster children and children living with their biological families in the general refugee camp population during the acute phase of the Rwandan refugee crisis.

During a 2-day period in July 1994, approximately 800 000 refugees crossed the Rwandan border into Goma, Zaire, completely overwhelming the available food and sanitation resources. During the first month of the crisis, almost 50 000 people died because of outbreaks of cholera and dysentery, as well as malnutrition.[4–7] During the first month of this emergency, more than 10 000 children were separated from their parents or orphaned[7]; in addition, because of the poor living conditions in the camps, many children were actively abandoned by their parents. The majority of these children were cared for in centers for unaccompanied children, where mortality rates were among the highest ever seen for unaccompanied children under the care of relief organizations. During the early months of the crisis, a program established by Food for the Hungry International (FHI) supported fostering as an alternative to placement in centers for unaccompanied children.

Using data from FHI program records, we compared weight gain and acute illness for children in foster families with those for children residing with their biological families. We chose children living with their biological families in the refugee camp for comparison rather than children in centers for unaccompanied children because the family setting is considered optimal.

METHODS

FHI Children Within the Natural Social Systems Program

In late July 1994, the Children Within Natural Social Systems program was established within the Mugunga refugee camp with the goals of preventing abandonment of children by their families and placing separated or orphaned children with foster families rather than in institutions. One component of this effort was a food supplementation program implemented because some families were not receiving their allocated ration from the general food distribution.[4] This program received food from the World Food Program based on the number of people enrolled. An allotment of food was distributed to families every 2 to 7 days; shorter intervals were provided for children perceived to be at higher risk to allow more frequent follow-up. This food allotment was based on the full food ration for the general camp population: 1962 kilocal/day plus a protein/calorie biscuit supplement for children younger than 5 years and malnourished children. FHI also provided the families with

some nonfood items, such as blankets and soap, as well as information about services available through other agencies, including medical and nutritional programs.

Although there was no active surveillance for at-risk children, all unaccompanied children found at the program site in the camp because of abandonment or other reasons and children who came to the program alone or with an adult were assessed by FHI staff. The assessment included the following: (1) an interview to obtain personal information about the child (and caretaker, if available) and to ascertain the child's history and current living situation, (2) a health assessment (measurement of weight and height, and visual inspection to determine general health), and (3) an assessment of the child's home or the previous night's sleeping site to determine the child's living conditions and to confirm the information given. If the parents of the child could be located, the child was returned to his or her biological family. Children whose parents could be located were considered eligible for the FHI program if the 3 factors listed above suggested that the children were at risk of abandonment or death or if it appeared that the caregiver had difficulty procuring the food ration due to illness or intimidation. In these cases, the FHI program provided the daily food ration for the child. Food also was provided to caregivers who were ill or who were unable to obtain food from the normal camp distribution due to intimidation (for example, female heads of household or minors caring for younger siblings). If no relatives could be located or if relatives were unwilling to care for the child, a foster placement was attempted. Appropriate placement was found for almost all unaccompanied children. Those who could neither be returned to their biological family nor fostered were referred to the center for unaccompanied children adjacent to the FHI program.

Children admitted to the FHI program were classified according to whether they lived with a family member ("biological") or a foster family ("foster"). Children in the biological group were under the care of either a nuclear family member (parent, sibling) or a more distant relative (e.g., grandparent, aunt, uncle, cousin). The biological category included children who were either marginally malnourished or at risk of abandonment or both. (Biological children who were very ill or severely malnourished were considered high risk; they constituted a third category, which is not included in this analysis.) In addition, some children were admitted to the biological category because they were in a family that had another child enrolled in the FHI program. Such children were enrolled to avoid the sharing of food support given to the child in the FHI program with other children in the family. Children in the foster group were unaccompanied, that is, either their caregivers had died or the children had been separated from their families during the exodus. This category included all such children regardless of physical status or stability of their living situation in the camp. In our analysis we included all biological and foster children who had more than 1 program visit, and we used data routinely collected in the FHI program.

Analysis Plan

The 2 main outcomes considered in this analysis were weight gain and illness. At the food distribution visits, the children were weighed and measured before receiving their food ration. Weight gain was modeled rather than change in weight-for-height *z* score because data on height were missing for a significant number of children. Program staff routinely recorded acute illness reported by the caregiver (diarrhea, upper respiratory infection, fever, or measles) as well as the presence of kwashiorkor (including edema). FHI tried to locate children and their caregivers from both groups who were lost to follow-up to determine why participation in the program was discontinued.

Before we conducted the analyses of weight gain and acute illness, the potential impact of bias due to differential attrition was assessed by 2 comparisons: the proportion of foster and biological children with more than 1 visit and the proportion who remained in follow-up longer than 7 weeks. In addition, to limit potential bias from temporal trends, we restricted our analysis data set for weight gain and illness to children who were enrolled during and shortly after the epidemics of cholera and dysentery (August through November 1994). Additionally, we included only children aged 16 years or younger, because there were very few children older than 16 years enrolled in the FHI program.

We used latent growth curve analysis to examine factors associated with weight and weight gain among foster and biological children. This technique, which models changes in a variable over time, can be used to analyze data when the number and timing of visits vary and can accommodate predictor variables that are either time invariant (e.g., a child's sex) or time dependent (e.g., acute illness status at a visit).[8] In this model, the time term estimates the rate of weight change (kg/month) for the entire population. The analysis was conducted using SAS PROC MIXED (SAS Institute Inc, Cary, NC) with restricted maximal likelihood estimation with an autoregressive correlation structure. This correlation structure specifies that data from visits are more highly correlated the closer together they occur.

Initially, the rate of weight gain for the entire population was modeled as a linear function of time. Associations of weight gain with demographic and environmental variables were then analyzed. Interaction terms between time and individual demographic and environmental variables were used to assess whether rate of weight gain differed by category (e.g., foster vs biological). Those factors associated with weight gain at the bivariate level were included in a multivariate model. The variable indicating foster or biological children was forced into the multivariate model to assess the independent effect of family status after adjustment for demographic and environmental factors. The variables included in the regression model for weight gain were chosen because of their availability in the routinely collected FHI data and their possible relation to child health and well-being. These variables included (1) 4 items potentially related to weight or acute illness (child's age, child's sex, severe malnutrition [$<65\%$ weight for height or kwashiorkor], and illness at a visit), (2) 2 items potentially related to caregivers' ability to provide adequate care (caregivers' sex and status [single or couple]), (3) 2 environmental factors (not having blankets and plastic sheeting), and (4) month of enrollment to control for temporal trends.

Multivariate analysis was used to assess the association of family status (foster or biological) with reported acute illness. The potential covariates considered in this model were the same as those for weight gain. The association of self-reported illness with family status, demographic, or environmental factors was evaluated using a repeated measures logistic regression analysis (SAS PROC GENMOD [SAS Institute Inc, Cary, NC]). As in the weight gain analysis, correlation between observations from the same person was accounted for with the use of an autoregressive correlation matrix. Odds ratios for factors associated with illness and the 95% confidence intervals were calculated.

Matched Pair Analysis

A second analysis using data from 33 pairs of children was conducted to examine the rate of weight gain by family status. Each pair consisted of 1 foster and 1 biological child who were the same age and weight at baseline and who resided in the same family.

RESULTS

Study Population

A total of 4198 children were seen at least once in the child support program. Loss to follow-up after 1 visit was higher for biological children, children who were enrolled in August, children who had a single caregiver, and female children (data not shown). Our analytic data set (children aged 16 years or younger who were enrolled between August 1 and November 30, 1994, and who had more than 1 visit) included data on 971 biological and 784 foster children (Table 1). The mean length of follow-up was longer for foster children, and they were more likely than biological children to remain in follow-up for 84 days or longer (52% vs 28%). In the analytic data set, differences in follow-up associated with family status were statistically significant, whereas differences in follow-up associated with other demographic and environmental factors—including month of enrollment, caregiver's status, and sex of both child and caregiver—were not (data not shown).

At enrollment, foster children were significantly older than biological children and had higher mean weight (Table 1). Foster children were significantly less likely to have a female or a single caregiver, less likely to be in a household without plastic sheeting, and less likely to have severe malnutrition. They also differed by month of enrollment. There were no significant differences by child's sex, possession of a blanket, or being ill at baseline.

Nutrition

Monthly weight gain or loss among foster and biological children was examined first. Because weight gain, as well as weight, varies by age, we stratified the sample into 2-year age groups and compared weight gain within each group. In general, foster and biological children gained weight during follow-up (mean weight gain was greater than zero for all age groups; Figure 1). However, there was considerable variability in change in weight; weight loss was seen among some children in all but 1 age group. No significant differences in mean weight gain were seen when foster children were compared with biological children of the same age ($P=.15$).

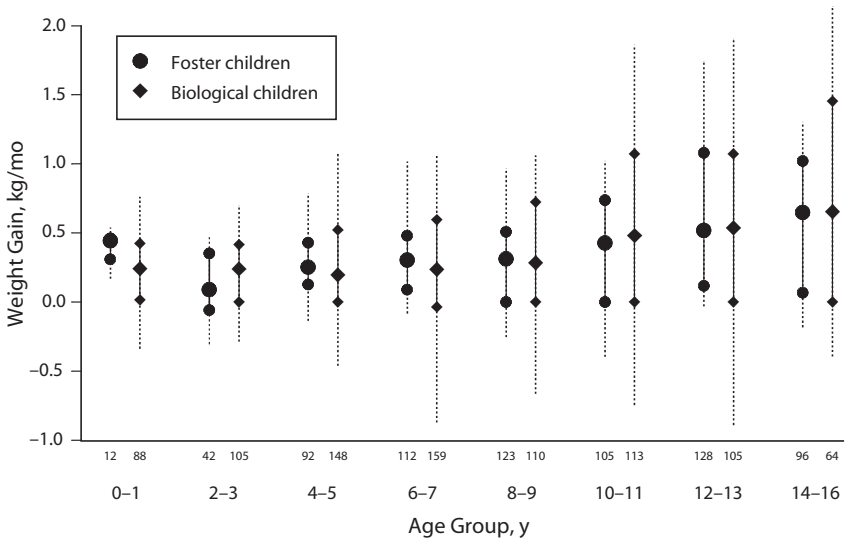
Weight gain was then modeled using latent growth curve analysis; the initial model using latent growth curve analysis included weight as the outcome and time as the sole covariate. The time term was highly significant ($P=.001$), and weight gain appeared to be linear over the observation period. Average weight gain was 0.40 kg/month for the entire population.

The demographic and environmental items were then added individually to the weight gain model. The resulting models examined whether weight gain differed for the subgroups defined by individual factors—for example, for foster versus biological children, for children of different ages, or for children with or without blankets. When the model included family status, the estimated rate of weight gain for foster (0.41 kg/month) and biological children (0.36 kg/month) did not differ significantly (Table 2). When added to the model, child's age interacted significantly with weight gain; older children showed greater weight gain per month. None of the other covariates was significantly associated with weight gain. The final multivariate model, which included data from 1629 children, contained family status, time, and the only term that was significant in the individual models, child's age. Children's average weight gain increased 0.02 kg/month with each additional year of age ($P<.001$). In this

TABLE 1—Characteristics of Refugee Children Enrolled in a Child Support Program in Mugunga Refugee Camp: Goma, Zaire, August to November 1994

	Family Status		
	Foster (n = 784[a])	Biological (n = 971[a])	*P* Value
Mean time of follow-up, d (SD)	120.7 (76.3)	70.3 (53.1)	<.001
Mean age, y (SD)	9.0 (3.8)	7.2 (4.1)	<.001
Mean weight at enrollment, kg (SD)	23.4 (9.8)	19.4 (9.3)	<.001
Female, no. (%)	370 (51.5)	501 (55.3)	.13
Female caregivers, no. (%)	429 (66.7)	640 (75.1)	<.01
Single caregivers, no. (%)	371 (68.7)	478 (78.5)	<.01
No plastic sheeting, no. (%)	233 (39.7)	342 (45.9)	<.05
No blankets, no. (%)	156 (26.6)	229 (30.8)	.09
Month of enrollment, No. (%)			
August	112 (14.5)	164 (17.0)	
September	204 (26.4)	207 (21.4)	
October	225 (29.1)	348 (36.0)	
November	233 (30.1)	248 (25.7)	<.001
Severe malnutrition at first visit, no. (%)	23 (3.1)	59 (6.4)	<.01
Acute illness at first visit, no. (%)	235 (30.5)	308 (32.9)	.30

[a]Numbers listed for individual covariates may not sum to 784 or 971 because of missing values.



Note. The bottom and top of each segment are the 10th and 90th percentiles, and the lower, center, and upper dots are the 25th, 50th, and 75th percentiles, respectively.
The number in each group appears directly below each line segment.

FIGURE 1—Weight gain by age. Average weight gain per month is shown for foster and biological children after stratification by age at enrollment.

model, foster children did not differ from biological children in rate of weight gain (0.20 vs 0.19 kg/month, P=.98).

To control for differences in the distribution of the age in the 2 groups of children, we repeated the growth curve analysis using only data from children aged 9 years or younger. Weight gain of the foster and biological children did not differ significantly in this analysis. To assess the potential influence of differential follow-up, we repeated the analysis after truncating follow-up at 84 days; results differed only slightly in this truncated sample. This analysis showed some differences in weight gain by month of enrollment (for September only) but was otherwise similar to the final model shown in Table 2. There was no difference in weight gain between foster and biological children .

In a separate analysis, we examined weight gain among paired biological and foster children living in the same family (Table 3). This sample of paired children was followed for a mean of 77 days; the range was 35 to 108 days. There was no significant difference in mean rate of weight gain of the paired children (foster=0.36 kg/month; biological=0.41/kg/month, P=.68). In 17 (51.5%) pairs, weight gain of foster children was greater than that for biological children; in 16 (48.5%) pairs, biological children gained more than foster children.

Illness

In bivariate analysis, the probability of illness at a visit differed by age, weight, family status, and whether the child had severe malnutrition. In the multivariate analysis, illness was less frequent among foster children (odds ratio [OR]=0.79, 95% confidence interval [CI]=0.70, 0.88), children with higher mean weight (OR=0.97, 95% CI=0.96, 0.99, measured as change in risk per kilogram), and children without severe malnutrition (OR=0.21, 95% CI=0.15, 0.29). In this model, the change in risk of illness per year of age was no longer significant (OR=1.02, 95% CI=0.99, 1.05). When the analysis was restricted to children aged 9 years and younger, all associations observed using the full data set remained significant. In an analysis that restricted the sample to those with fewer than 84 days of follow-up, family status and weight were no longer significant. The only significant association in this model was decreased risk of illness among children without severe malnutrition.

DISCUSSION

In the analysis of weight gain, foster and biological children living in an acute refugee setting did not differ. Our findings on weight gain were the same whether we included all children enrolled in the support program, restricted subsets with more uniform age and follow-up, or 33 pairs of foster and biological children of the same age and weight at enrollment. In multivariate analyses using the full data set, foster children appeared less likely to be ill; when analysis was restricted by age or length of follow-up, rates of illness did not differ.

Data for this study were taken from records from a program that provided support to children during one of the worst refugee emergencies of the 20th century. Under these circumstances, it was impossible to impose the controls that one would wish to have in a study on the management of malnourished refugee children or the potential benefits of foster care for unaccompanied children. The chaotic camp environment influenced the type and amount of data that could be collected. Follow-up of children in the FHI program was highly variable and occurred at irregularly spaced intervals. The foster children remained in the support program for a significantly longer period of time. We were unable to assess whether differential follow-up was due to illness. Differential follow-up due to illness seems unlikely in light of our observation that children who were ill at baseline were not more likely to be lost to follow-up.

Several characteristics of the data suggest that these findings accurately reflect the experience of children during acute refugee emergencies. Because of the large sample size, our results may provide a more representative picture of the health outcomes of refugee children than results of smaller studies in institutionalized populations. In addition, our analyses of weight gain among these children showed strikingly consistent results; separate analyses involving 2 different data sets showed no difference in weight gain between foster and biological children. Finally, the sta-

TABLE 2—Mean Weight Gain Estimated From Initial and Final Multivariate Models: Goma, Zaire, August to November 1994

	Individual Models Weight Gain, kg/mo	*P* value	Final Model Weight Gain, kg/mo	*P* value
Family status				
Foster	0.41	.14	0.2	.98
Biological	0.36		0.19	
Child's age[a]	0.02	.001	0.02	< .001
Blankets				
None	0.37	.17		
≥ 1	0.45			
Acute illness at visit				
No	0.40	.16		
Yes	0.38			
Month of enrollment				
August	0.36	.25		
September	0.39	.65		
October	0.41	.92		
November	0.42			
Severe malnutrition at visit				
No	0.40	.72		
Yes	0.38			
Child's sex				
Male	0.38	.60		
Female	0.40			
Caregiver's gender				
Male	0.38	.80		
Female	0.39			
Caregiver's status				
Single	0.40	.73		
Couple	0.42			
Plastic sheeting				
Yes	0.41	.36		
No	0.36			

[a]Represents increase in monthly weight gain per year of age.

TABLE 3—Characteristics of 33 Pairs of Foster and Biological Children Living With the Same Family: Goma, Zaire, August to November 1994

	Mean Age, y (Range)	Females, No. (%)	Mean Follow-Up, d (Range)	Mean Weight at Enrollment, kg (Range)	Mean Weight at Last Follow-Up, kg (Range)	Mean Weight Gain, kg/mo (Range)
Foster children	7.8 (0–16)	20 (61)	79.3 (35–108)	22.4 (6.3–42.0)	23.4 (6.5–50.5)	0.36 (–0.7–1.4)
Biological children	7.6 (0–16)	21 (64)	79.4 (35–108)	22.5 (8.6–42.0)	23.5 (8.7–44.0)	0.41 (–0.3–1.7)

tistical methods used enabled utilization of all available follow-up data despite unequally spaced visits.

Little information is available on the physical well-being of children in foster care during refugee emergencies or other crisis situations such as warfare. Studies of children displaced or orphaned because of war or famine have compared children in institutional settings with children in more traditional foster care or with children living with their biological families. These studies have generally reported higher rates of stress-related reactions and behavioral problems and lower rates of emotional attachment among institutionalized children.[9–11] Unfortunately, such studies have usually been small (< 100 children) and conducted after the acute phase of the refugee crisis and have not included medical indexes of well-being such as nutritional status and illness. One Ethiopian study found that children living in an orphanage were shorter than family-reared children of the same age but did not differ by weight, weight for height, edema, conjunctival pallor, xerophthalmia, or goiter.[11]

Other studies set in Africa, particularly of the fostering of AIDS orphans by family members, support fostering as a practice. Most studies have reported little evidence of discrimination or exploitation of orphaned children placed in foster care,[12] a limited effect on school attendance, and no significant effect on mortality in comparison with nonorphaned children from the same communities.[13] These data complement the findings we present in supporting the practice of child fostering as a means of maintaining physical support to children in emergency situations.

A direct comparison of children placed in centers for unaccompanied children with fostered or biological children in the Goma refugee camps is not possible.[5,7] Nonetheless, it is clear that unaccompanied children placed in designated centers experienced extremely high crude mortality rates (up to 20 to 120 per 10 000 per day).[5] Deaths among children aged younger than 1 year were even more frequent (226 to 817 deaths per 10 000 per day).[7] One potential cause of excess mortality among unaccompanied children in these centers was staffing shortages, since high staff-to-infant ratios are needed, especially when staff are caring for sick children or infants.[7] Future research should evaluate the potential advantage of foster care for these infants. Foster parents could reasonably provide timely feeding to infants and could participate in treat-

ment regimens, as family members generally do in developing countries.

In conclusion, the data presented here offer a rare opportunity to assess the advisability of child fostering in acute refugee situations. The results of this analysis suggest that weight gain or illness among foster children and children residing with their biological families did not differ. In addition, in this acute refugee situation, children placed in foster homes were more likely than biological children to be followed up in a child support program. These findings offer empirical support for the United Nations recommendation that during acute emergency situations, such as occurred in Goma, "Children should be fostered with other families wherever possible, not isolated from their communities in institutions."[1] ■

About the Authors

Ann Duerr was with the Division of Reproductive Health, Centers for Disease Control and Prevention, Atlanta, Ga. Samuel F. Posner is with the Department of Psychology, University of Southern California, Los Angeles. Mark Gilbert is with Food for the Hungry, International, Goma, Zaire.

Requests for reprints should be sent to Ann Duerr, HIV Vaccine Trials Network, Core Operations Center, Fred Hutchinson Cancer Research Center, 1100 Fairview Ave N, J3-100, Seattle, WA 98109 (e-mail: aduerr@hvtn.org).

This article was accepted March 2, 2003.

Contributors

A. Duerr took the lead in conceptualizing and writing the article. S.F. Posner conducted the data analysis and participated in the preparation of the article. M. Gilbert oversaw the collection of the data and assisted in the preparation of the article.

Acknowledgments

The authors gratefully acknowledge the collaboration of UNICEF, which provided support during the initiation of this project, and Food for the Hungry International for support throughout the data collection period.

The authors also acknowledge Michelle Redfern and Rafael Majoro for their assistance during data collection and Clinton Alverson for his assistance during data analysis. We gratefully acknowledge the creative technical assistance of Charles M. Heilig, Ph.D.

Human Participant Protection

No protocol approval was needed for this study.

References

1. *Assisting in Emergencies.* New York, NY: UNICEF House, Emergency Operations; 1998. Publication 9280631470.

2. *Refugee Children: Guidelines on Protection and Care.* Geneva, Switzerland: United Nations High Commissioner on Refugees; 1994.

3. Melville MB, Lykes MB. Guatemalan Indian children and the sociocultural effects of government-sponsored terrorism. *Soc Sci Med.* 1992;34:533–548.

4. Paquet C, van Soest M. Mortality and malnutrition among Rwandan refugees in Zaire [letter]. *Lancet.* 1994;344:823–824.

5. The Goma Epidemiology Group. Public health impact of Rwandan refugee crisis: what happened in Goma, Zaire in July 1994? *Lancet.* 1995;345: 339–344.

6. Siddique AK, Salam A, Islam MS, et al. Why treatment centres failed to prevent cholera deaths among Rwanda refugees in Goma, Zaire. *Lancet.* 1995;345: 359–361.

7. Dowell SF, Toko A, Sita C, Piarroux R, Duerr A, Woodruff BA. Health and nutrition in centers for unaccompanied refugee children: experience from the 1994 Rwandan refugee crisis. *JAMA.* 1995;273: 1802–1806.

8. McArdle JJ, Hamagami F. Modeling incomplete longitudinal and cross-sectional data using latent growth structural models. *Exp Aging Res.* 1992,18: 145–166.

9. Ahmad A, Mohamad K. The socioemotional development of orphans in orphanages and traditional foster care in Iraqi Kurdistan. *Child Abuse Negl.* 1996; 20:1161–1173.

10. Ajdukovic M, Ajdukovic D. Psychological well being of refugee children. *Child Abuse Negl.* 1993;17: 843–854.

11. Aboud F, Samuel M, Hadera A, Addus A. Intellectual, social and nutritional status of children in an Ethiopian orphanage. *Soc Sci Med.* 1991;33: 1275–1280.

12. Foster G, Shakespeare R, Chinemana F, et al. Orphan prevalence and extended family care in a peri-urban community in Zimbabwe. *AIDS Care.* 1995;7: 3–17.

13. Kamali A, Seeley JA, Nunn AJ, Kengeya-Kayondo JF, Ruberantwari A, Mulder DW. The orphan problem: experience of a sub-Saharan Africa rural population in the AIDS epidemic. *AIDS Care.* 1996;8:509–515.